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(54) **ADDITIONAL INPUT SOURCES FOR DATA ACQUISITION AT DISTRIBUTED SCAN MANAGEMENT SYSTEMS**

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H04N 1/00 (2006.01)

(52) **U.S. Cl.**
CPC ***H04N 1/00172*** (2013.01); ***H04N 1/00127*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2006/0215208	A1	9/2006	Takayama	
2006/0290967	A1	12/2006	Sumitomo et al.	
2007/0177192	A1*	8/2007	Wang	358/1.15
2007/0263260	A1*	11/2007	Ohta	358/448
2009/0219561	A1	9/2009	Kozuka	
2009/0240697	A1*	9/2009	Fenelon	707/10
2009/0290190	A1	11/2009	Torii	
2010/0157349	A1*	6/2010	Hong	358/1.14
2011/0149352	A1	6/2011	Ding	
2012/0194837	A1*	8/2012	Kamata	358/1.13
2013/0155443	A1	6/2013	Wu et al.	
2013/0222861	A1	8/2013	Ding et al.	

OTHER PUBLICATIONS

Hameed, Windows 7/Windows Server 2008 R2: distributed scan management, Oct. 11, 2009, pp. 1-4 , http://blogs.technet.com/b/askperf/archive/2009/10/11/windows-7-windows-server-2008-r2-distributed-scan-management.aspx.*

Hameed: "Windows 7 / Windows Server, 2008, R2: Distributed Scan Management", dated Oct. 11, 2009, 4 pages.*

2011 Microsoft Windows, "Distributed Scan Device Web Service Protocol Summary", dated Dec. 1, 2011, 3 pgs.

(Continued)

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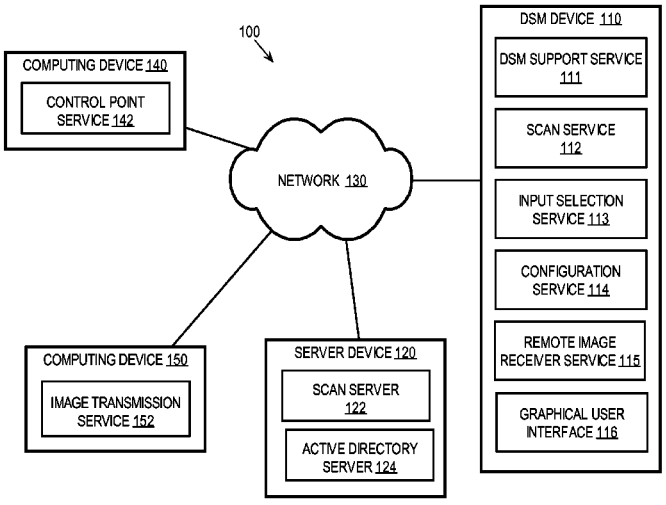
(57) **ABSTRACT**

A method and apparatus is provided for acquiring document data from additional input sources to a DSM system. In an embodiment, a DSM computing device includes a remote image receiver service configured to connect to a remote image source via a network connection, receive configuration information and image data from the remote image source, and determine post scan processing instructions based, at least in part, on the configuration information. In another embodiment, a DSM computing device includes an input selection service configured to identify one or more input sources available at the computing device, receive input source information identifying a particular input source of the one or more input sources, receive image information identifying the particular image data residing on the particular input source, retrieve the particular image data from the particular input source, and make the particular image data available to a distributed scan management service.

12 Claims, 5 Drawing Sheets



(56) **References Cited**

OTHER PUBLICATIONS

2011 Microsoft Windows, "Distributed Scan Processing Web Service Protocol Summary", dated Dec. 1, 2011, 3 pgs.
U.S. Appl. No. 13/331,992, filed Dec. 20, 2011, Office Action, Mailed Aug. 13, 2013.
U.S. Appl. No. 13/406,401, filed Feb. 27, 2012, Office Action, Mailed Aug. 13, 2013.
Mike Fenelon and Erhan Soyer-Osman: "Distributed Scan Management", Internet Citation, dated Nov. 6, 2008, 25 pages.
European Patent Office, "Search Report" in application No. 12198673.1-1903, dated Sep. 1, 2014, 7 pages.
U.S. Appl. No. 13/331,992, filed Dec. 20, 2011, Final Office Action, Mailed Nov. 17, 2014.
U.S. Appl. No. 14/872,933, filed Oct. 1, 2015, Office Action.

* cited by examiner

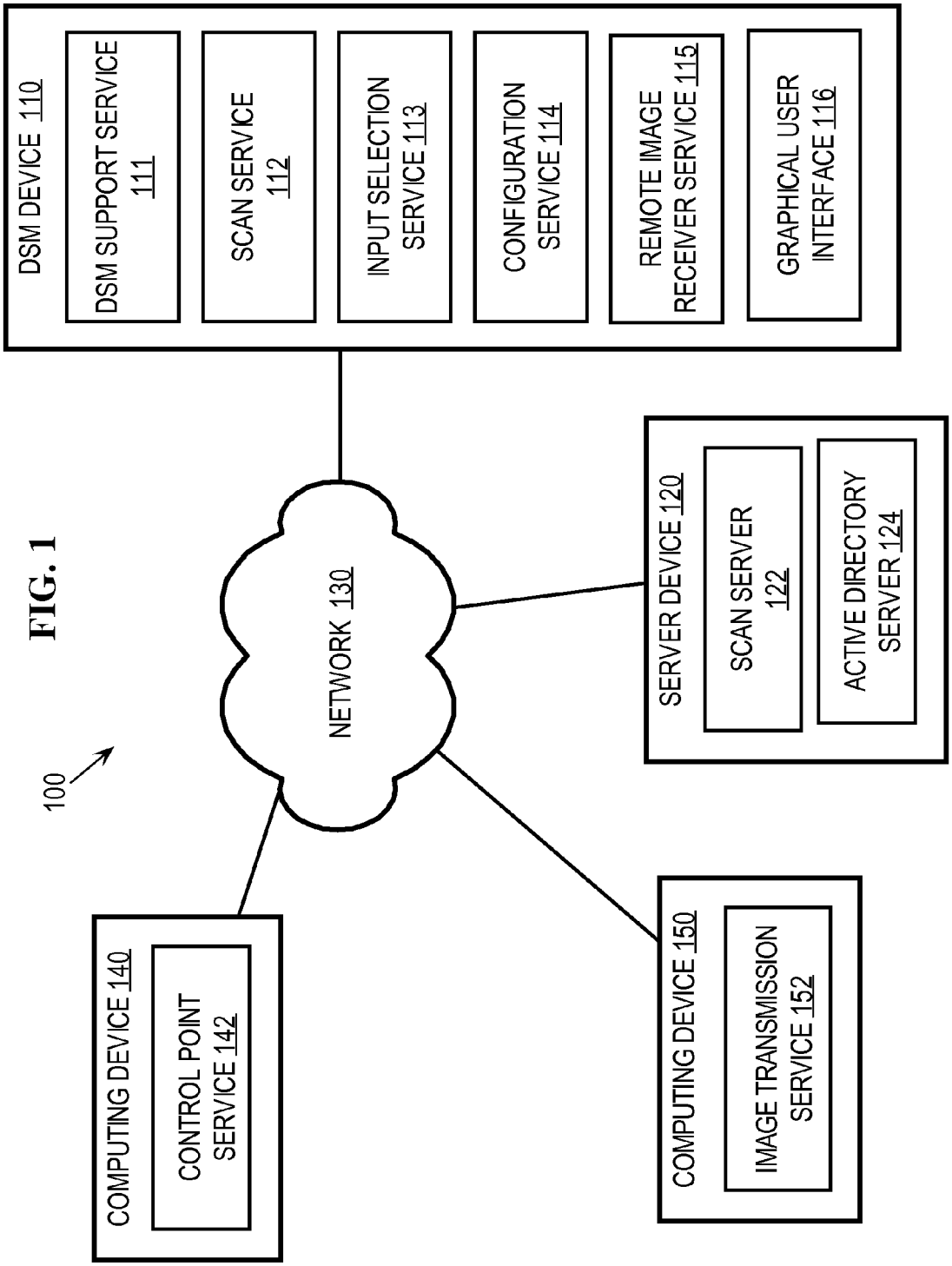

100
DSM DEVICE 110
DSM SUPPORT SERVICE 111
SCAN SERVICE 112
INPUT SELECTION SERVICE 113
CONFIGURATION SERVICE 114
REMOTE IMAGE RECEIVER SERVICE 115
GRAPHICAL USER INTERFACE 116
NETWORK 130
SERVER DEVICE 120
SCAN SERVER 122
ACTIVE DIRECTORY SERVER 124
COMPUTING DEVICE 140
CONTROL POINT SERVICE 142
COMPUTING DEVICE 150
IMAGE TRANSMISSION SERVICE 152

FIG. 1

FIG. 2

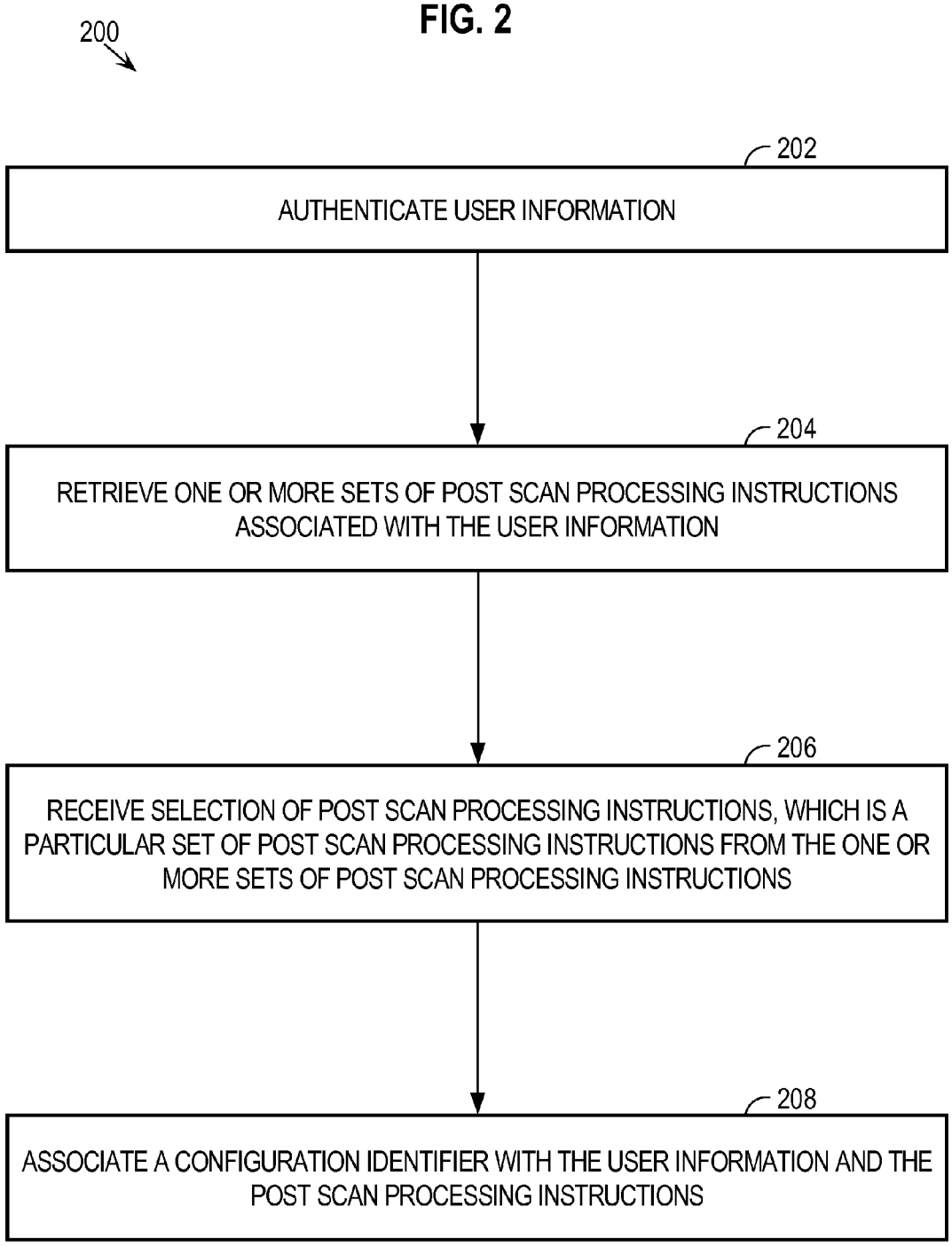

200
202
AUTHENTICATE USER INFORMATION
204
RETRIEVE ONE OR MORE SETS OF POST SCAN PROCESSING INSTRUCTIONS ASSOCIATED WITH THE USER INFORMATION
206
RECEIVE SELECTION OF POST SCAN PROCESSING INSTRUCTIONS, WHICH IS A PARTICULAR SET OF POST SCAN PROCESSING INSTRUCTIONS FROM THE ONE OR MORE SETS OF POST SCAN PROCESSING INSTRUCTIONS
208
ASSOCIATE A CONFIGURATION IDENTIFIER WITH THE USER INFORMATION AND THE POST SCAN PROCESSING INSTRUCTIONS

FIG. 3

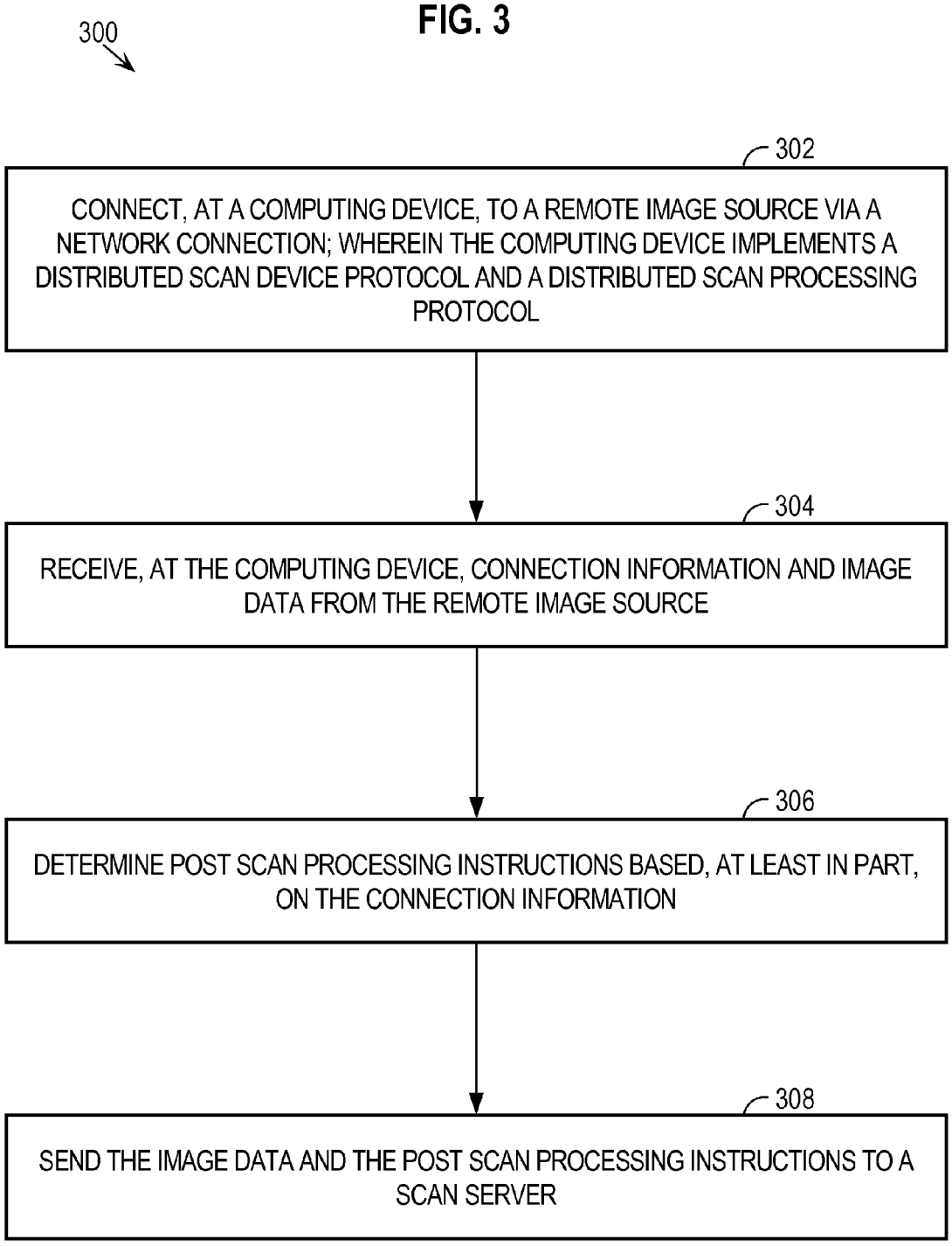
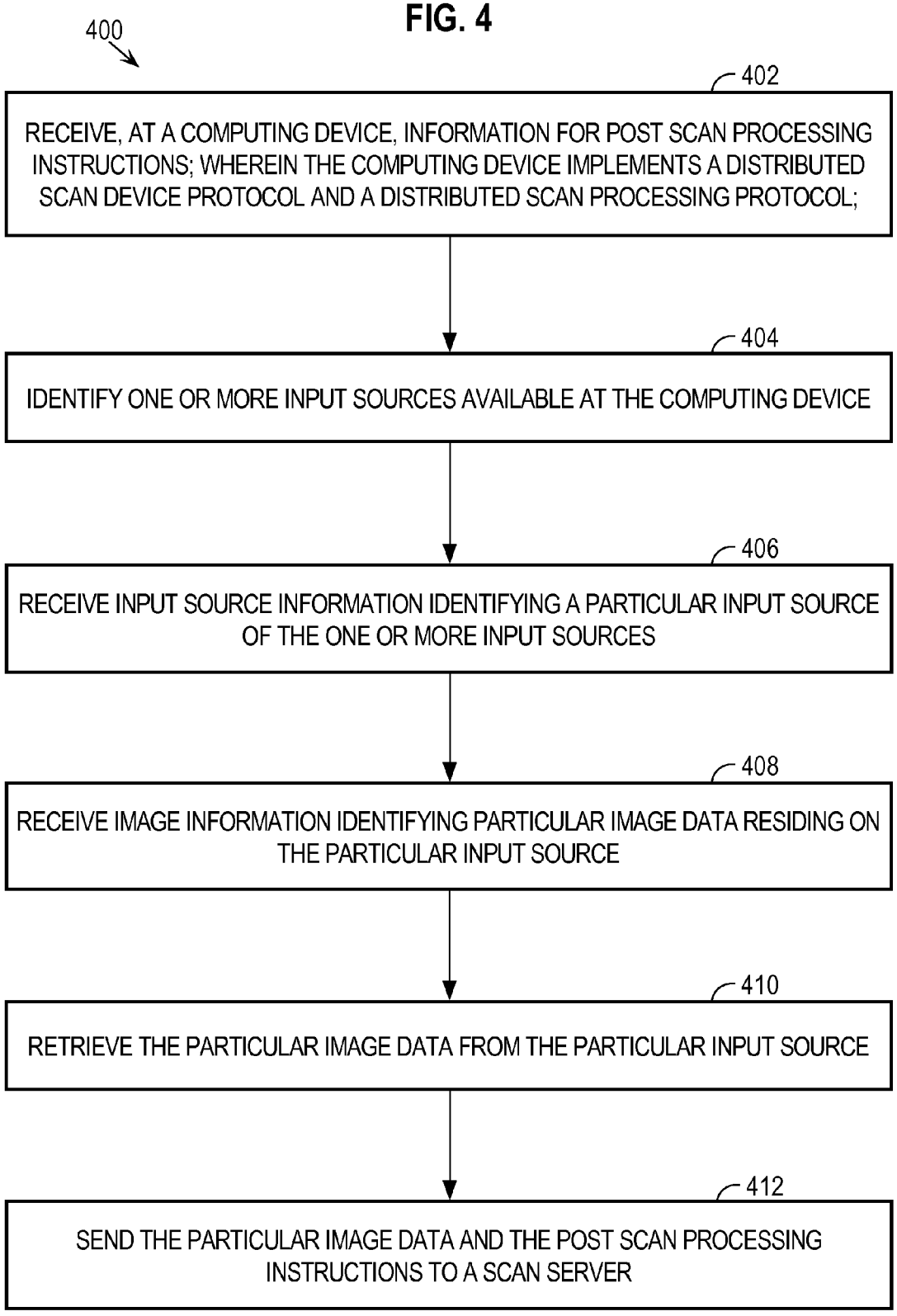

300
302
CONNECT, AT A COMPUTING DEVICE, TO A REMOTE IMAGE SOURCE VIA A NETWORK CONNECTION; WHEREIN THE COMPUTING DEVICE IMPLEMENTS A DISTRIBUTED SCAN DEVICE PROTOCOL AND A DISTRIBUTED SCAN PROCESSING PROTOCOL
304
RECEIVE, AT THE COMPUTING DEVICE, CONNECTION INFORMATION AND IMAGE DATA FROM THE REMOTE IMAGE SOURCE
306
DETERMINE POST SCAN PROCESSING INSTRUCTIONS BASED, AT LEAST IN PART, ON THE CONNECTION INFORMATION
308
SEND THE IMAGE DATA AND THE POST SCAN PROCESSING INSTRUCTIONS TO A SCAN SERVER

FIG. 4


400
402
RECEIVE, AT A COMPUTING DEVICE, INFORMATION FOR POST SCAN PROCESSING INSTRUCTIONS; WHEREIN THE COMPUTING DEVICE IMPLEMENTS A DISTRIBUTED SCAN DEVICE PROTOCOL AND A DISTRIBUTED SCAN PROCESSING PROTOCOL;
404
IDENTIFY ONE OR MORE INPUT SOURCES AVAILABLE AT THE COMPUTING DEVICE
406
RECEIVE INPUT SOURCE INFORMATION IDENTIFYING A PARTICULAR INPUT SOURCE OF THE ONE OR MORE INPUT SOURCES
408
RECEIVE IMAGE INFORMATION IDENTIFYING PARTICULAR IMAGE DATA RESIDING ON THE PARTICULAR INPUT SOURCE
410
RETRIEVE THE PARTICULAR IMAGE DATA FROM THE PARTICULAR INPUT SOURCE
412
SEND THE PARTICULAR IMAGE DATA AND THE POST SCAN PROCESSING INSTRUCTIONS TO A SCAN SERVER

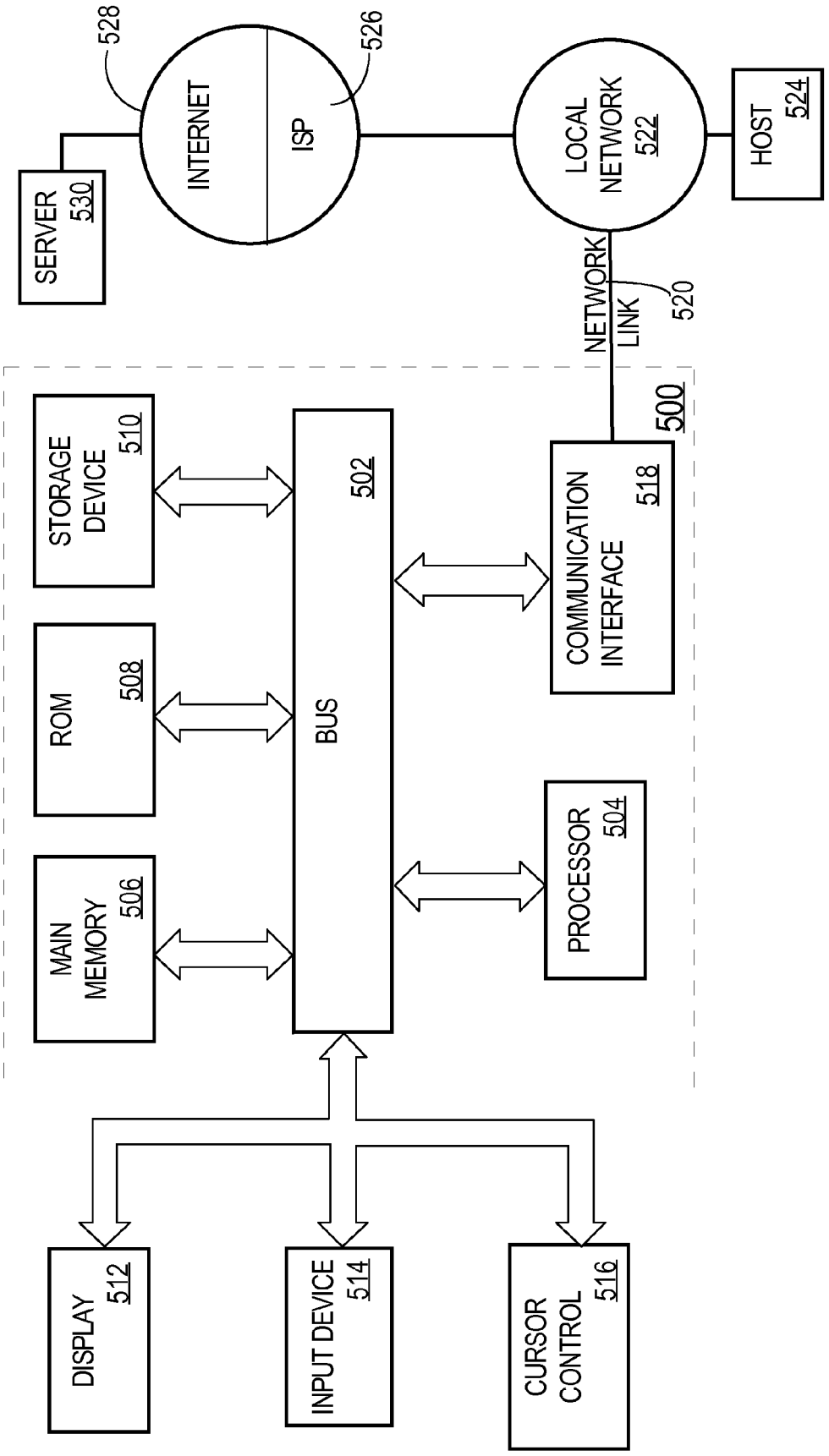

528
INTERNET
ISP
526
SERVER 530
LOCAL NETWORK 522
HOST 524
NETWORK LINK 520
500
STORAGE DEVICE 510
BUS 502
COMMUNICATION INTERFACE 518
ROM 508
MAIN MEMORY 506
PROCESSOR 504
DISPLAY 512
INPUT DEVICE 514
CURSOR CONTROL 516

FIG. 5

ADDITIONAL INPUT SOURCES FOR DATA ACQUISITION AT DISTRIBUTED SCAN MANAGEMENT SYSTEMS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is related to U.S. patent application Ser. No. 13/331,992, filed Dec. 20, 2011, entitled "Content-Based Security Processing Using Distributed Scan Management Protocols", the entire disclosure of which is hereby incorporated by reference as if fully set forth herein.

This application is related to U.S. patent application Ser. No. 13/406,401, filed Feb. 27, 2012, entitled "Quotas In Distributed Scan Management Systems", the entire disclosure of which is hereby incorporated by reference as if fully set forth herein.

FIELD OF THE INVENTION

The present invention relates to acquiring image data, by an enterprise scanning system, from additional input sources to the scanning system.

BACKGROUND

An enterprise scanning system implements protocols that allow for entities to easily route documents that enter the system via a scanning device according to rules determined by system administrators and/or users of scanning devices. An example enterprise scanning system is Distributed Scan Management (DSM) implemented by Microsoft and deployed in Windows 7/Windows 2008 Server R2.

An enterprise scanning system that is implemented using DSM (a "DSM system") allows a user to authenticate user data via a DSM scanning device and to select from one or more sets of post scan processing instructions that are made available to the user. A set of post scan processing instructions (PSP) contains instructions for routing acquired documents, including one or more destinations to which acquired document data should be sent. For example, a PSP may indicate that acquired document data should be emailed to one or more email addresses, copied to one or more specified file servers, uploaded to one or more specified websites, etc. A PSP may also include, among other things, settings for scanning data such as color style, scan resolution, file format type, etc.

After a user is authenticated and has selected a PSP, the user may scan document data into the system at the DSM scanning device. The DSM system processes the scanned document data according to the selected PSP.

DSM systems do not allow data acquisition in manners other than via scanning. This limitation of the manner of introducing data into a DSM system limits the usefulness of processing document data using the DSM system. It would be advantageous for a DSM system to allow users to introduce document data for processing by the DSM system from both scanners and other types of input sources external to the DSM system.

The approaches described in this section are approaches that could be pursued, but not necessarily approaches that have been previously conceived or pursued. Therefore, unless otherwise indicated, it should not be assumed that any of the approaches described in this section qualify as prior art merely by virtue of their inclusion in this section.

SUMMARY

An approach is provided for acquiring document data from additional input sources to a DSM system. In an embodiment, a computing device through which the document data is acquired includes a distributed scan management service that implements a distributed scan device protocol and a distributed scan processing protocol. The distributed scan management service is configured to send image data and post scan processing instructions to a scan server. The computing device also includes a remote image receiver service configured to connect to a remote image source via the network connection, receive configuration information and the image data from the remote image source, and determine the post scan processing instructions based, at least in part, on the configuration information.

In embodiments, the computing device also includes a configuration service configured to authenticate user information, retrieve one or more sets of post scan processing instructions associated with the user information, receive selection of the post scan processing instructions, which is a particular set of post scan processing instructions from the one or more sets of post scan processing instructions, and associate a configuration identifier with the user information and the post scan processing instructions. In such embodiments, the configuration information comprises the configuration identifier. In further embodiments, the configuration information comprises an identifier of the post scan processing instructions.

Embodiments include the remote image receiver service further configured to connect to the remote image source via the network connection using Web services, and receive the configuration information and the image data from the remote image source using Web services.

In an embodiment, a computing device through which the document data is acquired includes a distributed scan management service that implements a distributed scan device protocol and a distributed scan processing protocol. The distributed scan management service is configured to receive information for post scan processing instructions, and send particular image data and the post scan processing instructions to a scan server. The computing device also includes an input selection service configured to identify one or more input sources available at the computing device, receive input source information identifying a particular input source of the one or more input sources, receive image information identifying the particular image data residing on the particular input source, retrieve the particular image data from the particular input source, and make the particular image data available to the distributed scan management service. In a further embodiment, the computing device includes a scan service configured to scan a document, wherein the particular image data is not generated by the scan service.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is a block diagram that depicts an example network arrangement for acquiring document data from additional input sources to a DSM system.

FIG. **2** illustrates a flowchart for initializing a configuration identifier for a remote image source.

FIG. **3** illustrates a flowchart for a DSM system acquiring image data from a remote image source.

FIG. **4** illustrates a flowchart for processing image data from a selected input source.

FIG. **5** is a block diagram of a computer system on which embodiments of the invention may be implemented.

DETAILED DESCRIPTION

In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide

a thorough understanding of the present invention. It will be apparent, however, that the present invention may be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form in order to avoid unnecessarily obscuring the present invention.

General Overview

An approach is provided for acquiring document data from additional input sources to a DSM system. In an embodiment, a computing device through which the document data is acquired includes a distributed scan management service that implements a distributed scan device protocol and a distributed scan processing protocol. The distributed scan management service is configured to send image data and post scan processing instructions to a scan server. The computing device also includes a remote image receiver service configured to connect to a remote image source via the network connection, receive configuration information and the image data from the remote image source, and determine the post scan processing instructions based, at least in part, on the configuration information.

In embodiments, the computing device also includes a configuration service configured to authenticate user information, retrieve one or more sets of post scan processing instructions associated with the user information, receive selection of the post scan processing instructions, which is a particular set of post scan processing instructions from the one or more sets of post scan processing instructions, and associate a configuration identifier with the user information and the post scan processing instructions. In such embodiments, the configuration information comprises the configuration identifier. In further embodiments, the configuration information comprises an identifier of the post scan processing instructions.

Embodiments include the remote image receiver service further configured to connect to the remote image source via the network connection using Web services, and receive the configuration information and the image data from the remote image source using Web services.

In an embodiment, a computing device through which the document data is acquired includes a distributed scan management service that implements a distributed scan device protocol and a distributed scan processing protocol. The distributed scan management service is configured to receive information for post scan processing instructions, and send particular image data and the post scan processing instructions to a scan server. The computing device also includes an input selection service configured to identify one or more input sources available at the computing device, receive input source information identifying a particular input source of the one or more input sources, receive image information identifying the particular image data residing on the particular input source, retrieve the particular image data from the particular input source, and make the particular image data available to the distributed scan management service. In a further embodiment, the computing device includes a scan service configured to scan a document, wherein the particular image data is not generated by the scan service.

Architecture for Processing Acquired Document Data

FIG. **1** is a block diagram that depicts an example network arrangement **100** for acquiring document data from additional input sources to the DSM system represented in example network arrangement **100**, according to embodiments. Network arrangement **100** includes a DSM device **110**, a server device **120**, and computing devices **140** and **150**, communicatively coupled via a network **130**. The DSM system represented in example network arrangement **100** includes the services and servers on DSM device **110**, server device **120**, and computing device **140**, and may include other services and servers according to a particular implementation.

In example network arrangement **100**, DSM device **110** is configured to acquire document data via selected or remote input sources, and process the data according to a selected PSP, as described in further detail below. An input source may be external to the DSM system of example network arrangement **100**, i.e., an input source that is physically separate from devices that host services and servers for the DSM system. An input source that is external to the DSM system of example network arrangement **100** may be communicatively connected to a device that hosts one or more services and/or servers for the DSM system, e.g., via network **130**, via a USB port, serial port, or other physical connection receptor of a device that hosts one or more services and/or servers for the DSM system, etc.

DSM device **110** may be implemented by any type of device that is capable of acquiring document data, implementing a distributed scan device protocol and a distributed scan processing protocol, and communicating with one or more of server device **120**, computing device **140**, and computing device **150** via network **130**. A description of a distributed scan device protocol may be found in "DISTRIBUTED SCAN DEVICE WEB SERVICE PROTOCOL SUMMARY" located at "en-us/library/windows/hardware/ff540604%28v=VS.85%29.aspx" on the server "msdn.microsoft.com", the contents of which are incorporated by reference as if fully set forth herein. Further, a description of a distributed scan processing protocol may be found in "DISTRIBUTED SCAN PROCESSING WEB SERVICE PROTOCOL SUMMARY" located at "en-us/library/windows/hardware/ff540624%28v=VS.85%29.aspx" on the server "msdn.microsoft.com", the contents of which are also incorporated by reference as if fully set forth herein.

In example network arrangement **100**, DSM device **110** is configured with a DSM support service **111**, a scan service **112**, an input selection service **113**, a configuration service **114**, a remote image receiver service **115**, and a graphical user interface **116**. DSM device **110** may be configured with other mechanisms, processes and functionality, depending upon a particular implementation. According to particular embodiments, DSM device **110** may be configured without one or more of the services associated therewith in example network arrangement **100**. The approaches described herein for processing acquired document data are not limited to any particular type of DSM device or network configuration. For example, implementations of DSM device **110** may include a computing device, a scanning device, a multi-function peripheral (MFP) that performs any combination of printing, copying, facsimile, and scanning, etc. Any number of devices, including printing devices, scanning devices, client devices, administrative console devices, and other computing devices, may be included in the network.

DSM support service **111** may be implemented by one or more processes, and communicates with other applications and network devices. These communications include communications via (a) a distributed scan device protocol to communicate with a control point, e.g., control point service **142** of computing device **140**; and (b) a distributed scan processing protocol to communicate with a scan server, e.g., scan

server **122** of server device **120**. In an embodiment, one or more of the protocols implemented by DSM support service **111** are performed using Web services. In an embodiment, all of the communications made by DSM device **110** via network **130** is done using Web services. In these embodiments, at least DSM support service **111**, configuration service **114**, remote image receiver service **115**, scan server **122**, Active Directory server **124**, control point service **142**, and image transmission service **152** implement one or more Web services protocols, described in more detail below.

Scan service **112** is implemented by one or more processes for acquiring document data via a scanning device at DSM device **110** or made available to DSM device **110**, e.g., via network **130**. Input selection service **113** is implemented by one or more processes configured to identify one or more input sources available at DSM device **110** and retrieve image data from an available input source, as described in further detail below. Configuration service **114** is implemented by one or more processes configured to associate user information and selected post scan processing instructions with a configuration identifier, and is also described in further detail below. Remote image receiver service **115** is implemented by one or more processes configured to connect to a remote image source and receive image data from the remote image source, and is also described in further detail below. The services attributed to DSM device **110** in example network arrangement **100** are illustrative and the functions attributed to these services herein may be performed by any logical module at DSM device **110**.

DSM support service **111**, scan service **112**, input selection service **113**, configuration service **114**, and remote image receiver service **115** may be implemented as resident processes on DSM device **110**, e.g., as Java servlets. Alternatively, one or more of DSM support service **111**, scan service **112**, input selection service **113**, configuration service **114**, and remote image receiver service **115** may be made available to DSM device **110** on removable media or may be implemented at a remote location with respect to DSM device **110**. Also, DSM support service **111**, scan service **112**, input selection service **113**, configuration service **114**, and remote image receiver service **115** may be implemented as plug-ins, or in hardware, software, or any combination of hardware or software, depending upon a particular implementation.

DSM device **110** is further configured with graphical user interface **116**. Graphical user interface **116** may be displayed at a display device associated with DSM device **110**. A display device may be a monitor, a screen on DSM device **110**, etc. Graphical user interface **116** may be implemented in a browser, as a stand-alone application, etc., and may be managed by any service at DSM device **110**.

Network **130** may be implemented with any type of medium and/or mechanism that facilitates the exchange of information between two or more of DSM device **110**, server device **120**, and computing devices **140** and **150**. Furthermore, network **130** may use any type of communications protocol, and may be secured or unsecured, depending upon the requirements of a particular embodiment.

Server device **120** may be implemented by any type of device that is capable of communicating with DSM device **110** and/or computing device **140** over network **130**. In example network arrangement **100**, server device **120** is configured with scan server **122** and Active Directory server **124**, described in further detail below. Server device **120** may be configured with other mechanisms, processes and functionality, depending upon a particular implementation. In embodiments, scan server **122** and Active Directory server **124** are implemented as resident processes on Server device **120**. In other embodiments, one or more of scan server **122** and Active Directory server **124** are made available to server device **120** on removable media or may be implemented at a remote location with respect to server device **120**. Also, scan server **122** and Active Directory server **124** may be implemented as plug-ins, or in hardware, software, or any combination of hardware or software, depending upon a particular implementation.

Computing devices **140** and **150** may be implemented by any type of computing device that is capable of communicating with DSM device **110** and/or server device **120** over network **130**. In example network arrangement **100**, computing device **140** is configured with a control point service **142**. Also in example network arrangement **100**, computing device **150** is configured with an image transmission service **152** that may act as a remote image source that communicates with remote image receiver service **115** on DSM device **110**, and is described in further detail below. In an embodiment, computing device **150** is capable of producing images. In this embodiment, computing device **150** may be a camera, a scanner, a copier, or any other device that produces image data. Computing devices **140** and **150** may be configured with other mechanisms, processes and functionalities, depending upon a particular implementation.

DSM Communications

DSM device **110** is considered to be a DSM-type device because DSM device **110**, via DSM support service **111**, communicates with control point service **142** using a distributed scan device protocol and with scan server **122** using a distributed scan processing protocol. In an embodiment, DSM support service **111** communicates with Active Directory server **124** via Lightweight Directory Access Protocol (LDAP).

Control point service **142** allows administrators to define PSPs and associate defined PSPs with one or more users or user groups. Control point service **142** causes information for the PSPs to be made accessible to Active Directory server **124**. For example, control point service **142** stores PSP information at memory for server device **120** that is accessible by Active Directory server **124**. In an embodiment, control point service **142** communicates with Active Directory server **124** via LDAP.

Web Services

The World Wide Web Consortium (W3C), which is an international consortium that develops standards for the World Wide Web, defines a "Web service" as a software system that is designed to support interoperable machine-to-machine interaction over a network. This definition encompasses many different systems, but in common usage, the term refers to those services that use Simple Object Access Protocol (SOAP)-formatted Extensible Markup Language (XML) envelopes and that have interfaces described using Web Services Description Language (WSDL). Web services allow devices and applications to communicate with each other over one or more networks without the intervention of any human being, while using the same suite of protocols (e.g., Hypertext Transfer Protocol (HTTP)) that a human being would use to communicate with such devices and applications over the one or more networks.

SOAP is an XML-based, extensible message envelope format, with bindings to underlying protocols (e.g., HTTP and Simple Mail Transfer Protocol (SMTP)). Using XML, SOAP defines how messages should be formatted, so that those

messages are formatted in such a way that the recipients of those messages (devices and applications) can understand the messages.

WSDL is an XML format that allows Web service interfaces to be described along with the details of those interfaces' bindings to specific protocols. WSDL is typically used to generate server and client code, and for configuration.

Thus, common core protocols of Web services are SOAP, and WSDL, as well as WS-Discovery, WS-MetadataExchange, WS-Transfer, WS-Eventing, and WS-Addressing. WS-Addressing defines two constructs, message addressing properties and endpoint references. The constructs normalize the information typically provided by transport protocols and messaging systems in a way that is independent of any particular transport or messaging system. (Web Services Addressing 1.0—Core, W3C Recommendation 9 May 2006 found at "TR/ws-addr-corer/" on the server "www.w3.org", published by the W3C, the contents of which are incorporated herein by reference.) A Web service endpoint is a (referenceable) entity, processor, or resource to which Web service messages can be addressed. (Id.) Endpoint references convey the information needed to address a Web service endpoint. (Id.)

Authentication and Configuration Identifiers

In an embodiment, a user may cause the DSM system represented in example network arrangement **100** to process image data that is available on a remote image source, such as image transmission service **152** of computing device **150**. Many professionals utilize image data in the course of employment, and remote access to a DSM system allows users that are at remote locations relative to physical components of the DSM system to cause the DSM system to process image data. For example, a user desires the DSM system of network arrangement **100** to process image data that is stored at computing device **150**. In an embodiment where computing device **150** has camera functionality, the image data may be captured by the user with the camera functionality of computing device **150**.

As previously indicated, a DSM system processes image data according to PSP that is selected by a user. According to an embodiment, a remote image source is configured with a configuration identifier that is mapped to both particular user information and PSP in a particular DSM system. The remote image source sends the configuration identifier to the DSM system with the image data that is to be processed by the DSM system. The DSM system processes the received image data according to the PSP associated with the configuration identifier. A remote image source may send a particular configuration identifier to the DSM system with image data for multiple images.

FIG. **2** illustrates a flowchart **200** for initializing a configuration identifier for a remote image source. Ordering of the steps of flowcharts herein are exemplary, and do not necessarily limit embodiments of the invention to such ordering. At step **202**, user information is authenticated. For example, a user inputs user information to DSM device **110** via graphical user interface **116**. DSM support service **111** authenticates the user information with Active Directory server **124**. If Active Directory server **124** does not authenticate the user information, then Active Directory server **124** returns an error to DSM support service **111**.

At step **204**, one or more sets of post scan processing instructions associated with the user information are retrieved. For example, Active Directory server **124** returns a list of PSPs associated with the authenticated user information to DSM support service **111**. DSM support service **111** displays the list of PSPs at graphical user interface **116**.

At step **206**, selection of post scan processing instructions, which is a particular set of post scan processing instructions from the one or more sets of post scan processing instructions, is received. For example, DSM support service **111** receives selection of a particular PSP of the displayed list of PSPs via graphical user interface **116**. The selected PSP may be configured for processing image data that is received from a remote image source.

At step **208**, a configuration identifier is associated with the user information and the post scan processing instructions. For example, configuration service **114** creates a configuration identifier and associates the configuration identifier with the authenticated user information and the PSP that was selected at step **206**. A mapping between (a) the configuration identifier and (b) the authenticated user information and selected PSP is stored at DSM device **110**. A configuration identifier may be a sequence of alphanumeric characters that uniquely identifies the selected user information/PSP pair among other user information/PSP pairs stored at DSM device **110**.

In one embodiment, configuration service **114** causes the configuration identifier created at step **208** to be displayed at graphical user interface **116**. The user may input the displayed configuration identifier into image transmission service **152**, as described in further detail below.

According to another embodiment, a user may be provided with a configuration identifier that is already mapped, at DSM device **110**, to the user's information and a particular PSP. For example, an administrator of the system may create a configuration identifier, associate the configuration identifier with the user's information and a PSP that is appropriate for remote image acquisition. A user may input the configuration identifier into image transmission service **152**, as described in further detail below.

In yet another embodiment, an administrator user configures a particular PSP for processing image data received from a remote image source and associates the PSP with a default user account at Active Directory server **124**. A default user account is a user account with authentication information that is known to configuration service **114**. The administrator user maps a PSP identifier to the PSP at DSM device **110**. A user may input the PSP identifier into image transmission service **152**, as described in further detail below. A PSP identifier may be a sequence of alphanumeric characters that uniquely identifies the PSP associated with the default user account. Image transmission service **152** may send a particular PSP identifier to the DSM system with image data for multiple images.

Configuration of a Remote Image Source

As previously indicated, a user may input configuration information (e.g., a configuration identifier, a PSP identifier, etc.) into a remote image source, such as image transmission service **152** of computing device **150**. In one embodiment, image transmission service **152** provides a graphical user interface through which a user inputs configuration information to the service. In another embodiment, a user communicates the configuration information to image transmission service **152** via email, text message, using voice recognition, or in any other manner.

Acquisition from Remote Image Source

FIG. **3** illustrates a flowchart **300** for a DSM system acquiring image data from a remote image source. At step **302**, a

computing device is connected to a remote image source via a network connection, wherein the computing device implements a distributed scan device protocol and a distributed scan processing protocol. For example, remote image receiver service **115** at DSM device **110** and image transmission service **152** at computing device **150** connect using Web services (such as WS-Discovery, WS-Transfer, and WS-MetadataExchange) via network **130**. As previously indicated, DSM device **110** communicates with control point service **142** using a distributed scan device protocol and with scan server **122** using a distributed scan processing protocol.

In one embodiment, image transmission service **152** is configured with information needed to connect to remote image receiver service **115** at DSM device **110** via Web services. For example, a user may input, to image transmission service **152**, information that identifies remote image receiver service **115** for WS-Discovery, including a service type and a unique identifier for the DSM system represented in network arrangement **100**. A unique identifier for the DSM system represented in network arrangement **100** uniquely identifies the DSM system among all other DSM systems accessible via network **130**. As another example, computing device **150** is configured with information identifying remote image receiver service **115** for WS-Discovery in storage accessible to image transmission service **152**, e.g., in a database.

For example, to connect to remote image receiver service **115**, image transmission service **152** sends a multicast Probe message over network **130**. The multicast Probe message indicates that image transmission service **152** seeks target services of a certain type, i.e., a remote image receiver service at a particular DSM system. For example, the multicast Probe message includes the service type indicator "RemoteImageReceiver". Image transmission service **152** also includes, in the Probe message, a unique identifier of the particular DSM system with which image transmission service **152** seeks to connect, i.e., the DSM system of network arrangement **100**. The Probe message may also include information about other aspects of the service sought by image transmission service **152**.

Remote image receiver service **115**, available on DSM device **110**, is accessible over network **130** and receives the multicast Probe message from image transmission service **152**. Remote image receiver service **115** determines that remote image receiver service **115** is a service of type "RemoteImageReceiver", that remote image receiver service **115** is associated with the particular DSM system indicated by the DSM system identifier, and that remote image receiver service **115** complies with all other aspects of the requested service, as indicated by the Probe message.

In response to this determination, remote image receiver service **115** sends a unicast Probe Match message to image transmission service **152** to indicate that DSM device **110** includes a service of the requested type, i.e., remote image receiver service **115**. Such a Probe Match message includes an endpoint reference for remote image receiver service **115**. The endpoint reference may include a source IP address for remote image receiver service **115**, including a port number at which remote image receiver service **115** may be accessed. For example, the Probe Match message sent by remote image receiver service **115** may indicate to image transmission service **152** that remote image receiver service **115** is at IP address "172.30.4.223", and is accessible at port "1600". Image transmission service **152** uses this endpoint reference to communicate image data and configuration information to remote image receiver service **115**.

In another embodiment, image transmission service **152** accepts configuration information and/or endpoint reference information for remote image receiver service **115**, e.g., via a graphical user interface at computing device **150**. Image transmission service **152** uses the received information to communicate with remote image receiver service **115** via Web services. In yet another embodiment, computing device **150** includes one or more of configuration information and an endpoint reference for remote image receiver service **115** in storage accessible by image transmission service **152**. In yet another embodiment, DSM device **110** includes endpoint reference information for image transmission service **152** in storage accessible by remote image receiver service **115**.

At step **304**, connection information and image data are received at the computing device from the remote image source. For example, image transmission service **152** is configured with a configuration identifier. Image transmission service **152** sends the configuration identifier and image data to remote image receiver service **115** using Web services. In an embodiment, image transmission service **152** uses the SOAP Message Transmission Optimization Mechanism (MTOM) protocol to send the image data to remote image receiver service **115**.

Remote image receiver service **115** listens for such communications from image transmission service **152**, and receives the configuration identifier and image data from image transmission service **152** when the information is sent. Depending upon a particular implementation, remote image receiver service **115** may receive further information from image transmission service **152**, including one or more of image format information, image size information, etc.

In an embodiment, remote image receiver service **115** receives a PSP identifier and image data from image transmission service **152**.

At step **306**, post scan processing instructions are determined based, at least in part, on the connection information. For example, remote image receiver service **115** causes configuration service **114** to retrieve the user information and PSP information mapped to the received configuration identifier. In one embodiment, configuration service **114** authenticates the user information and verifies that the PSP information is valid. PSP information is valid if the user information is still associated with the identified PSP. If the user information does not authenticate or the PSP information is not valid, then the services of DSM device **110** do not continue with the steps of flowchart **300**. If the user information authenticates and the PSP information is valid, then configuration service **114** communicates the identified PSP to remote image receiver service **115**. The identified PSP will be used to process the received image data.

In an embodiment where the configuration information sent from image transmission service **152** comprises a PSP identifier, configuration service **114** retrieves the applicable PSP based on the PSP identifier. For example, configuration service **114** recognizes that the PSP identifier identifies a PSP associated with a default user account (for which authentication information is known by configuration service **114**) and searches for a mapping between the PSP identifier and a PSP associated with the default user account. For example, configuration service **114** may authenticate the known default user information with Active Directory server **124** in order to obtain the PSPs associated with the default user account. If the PSP identifier is mapped to a PSP associated with the default user account, then the identified PSP is used to process the received image data. If the PSP identifier is not mapped to a PSP associated with the default user account, then the services of DSM device **110** do not continue with the steps of flowchart **300**.

In an embodiment where the identified PSP includes data acquisition settings that are applicable to the manner of data acquisition used to acquire the image data, such settings are applied to received image data.

At step **308**, the image data and the post scan processing instructions are sent to a scan server. Within embodiments of the invention, any service running on DSM device **110** may send information for the image data and identified PSP to scan server **122** for processing, including DSM support service **111**, configuration service **114**, remote image receiver service **115**, etc. To illustrate one embodiment, remote image receiver service **115** calls an API function for DSM support service **111** and passes to DSM support service **111** the identified PSP and information for the received image data (i.e., a reference to the received image data stored at DSM device **110**, the received image data itself, etc.). DSM support service **111** transmits the PSP and information for the received image data to scan server **122** using a distributed scan processing protocol. Scan server **122** processes the image data according to the accompanying PSP, including dispatching at least a portion of the image data to the destinations defined in the accompanying PSP.

In one embodiment, image transmission service **152** sends configuration information to remote image receiver service **115** separately with image data corresponding to each image file. In another embodiment, image transmission service **152** sends configuration information to remote image receiver service **115** with information for image data corresponding to multiple image files.

Status Update

Image transmission service **152** may request, from remote image receiver service **115**, information on the status of processing image data that image transmission service **152** has sent to remote image receiver service **115**. To illustrate, image transmission service **152** sends a request to remote image receiver service **115**, via Web services, requesting the status of processing particular image data. Image transmission service **152** may identify particular image data in the request using an image data identifier that uniquely identifies image data that has been sent to remote image receiver service **115**. In response to receiving the request, remote image receiver service **115** retrieves information on the status of processing the particular image data, e.g., from DSM support service **111**. An example of information on the status of processing particular image data is "Complete", "Pending", "Cancelled", etc.

Acquisition from Selected Input Source

In an embodiment, the DSM system represented in network arrangement **100** processes image data that is acquired from an input source that is selected by a user at DSM device **110**. For example, a user may request that the DSM system represented in network arrangement **100** process image data stored on an additional input source to the DSM system, such as a thumb drive, external hard drive, SD card, or any other device that may supply image data to DSM device **110**. The user identifies an input source available at DSM device **110**, and, if applicable, may select image data that is stored at the input source, which causes DSM device **110** to acquire the image data from the input source and initiate processing the image data according to a selected PSP.

FIG. **4** illustrates a flowchart **400** for processing image data from a selected input source. At step **402**, information for post scan processing instructions is received at a computing device, wherein the computing device implements a distributed scan device protocol and a distributed scan processing protocol. For example, a particular user inputs user authentication information to DSM device **110** via graphical user interface **116**. DSM support service **111** authenticates the user information with Active Directory server **124**. Active Directory server **124** returns, to DSM support service **111**, a list of PSPs that are associated with the authenticated user. DSM support service **111** causes the list of PSPs to be displayed at graphical user interface **116**. When the user selects a particular PSP from the list of PSPs, e.g., via graphical user interface **116**, DSM support service **111** receives information for the selected PSP. As previously indicated, DSM device **110** communicates with control point service **142** using a distributed scan device protocol and with scan server **122** using a distributed scan processing protocol.

At step **404**, one or more input sources available at the computing device are identified. For example, input selection service **113** of DSM device **110** identifies one or more input sources available at DSM device **110**. An input source that is available at DSM device **110** is a source that may supply DSM device with image data. The one or more input sources may include scan service **112**, an SD card, a thumb drive connected to DSM device **110**, an external hard drive connected to DSM device **110**, or any other device communicatively coupled to DSM device **110** that provides services of DSM device **110** with image data. For example, a thumb drive (or other storage device) that is connected to a USB port (or any other kind of port) of DSM device **110** is an input source available at DSM device **110**. As another example, a service running on DSM device **110** (such as scan service **112**) that may supply DSM device with image data is an input source available at DSM device **110**.

At step **406**, input source information identifying a particular input source of the one or more input sources is received. For example, input selection service **113** causes information for the one or more identified input sources that are available at DSM device **110** to be displayed at graphical user interface **116** for user selection. When the user selects an input source of the one or more displayed input sources, input selection service **113** receives information identifying the selected input source. In one embodiment, input selection service **113** receives information identifying an input source other than scan service **112**.

At step **408**, image information identifying particular image data residing on the particular input source is received. For example, input selection service **113** displays, at graphical user interface **116**, a directory listing reflecting information stored at the selected input source. The user may browse through the directory listing and select an image file, corresponding to particular image data, stored at the input source. Input selection service **113** receives information identifying the selected image file. In an embodiment, the user may select, for processing, multiple image files stored at the input source.

In an embodiment where the input source is not a storage device, input selection service **113** receives information identifying particular image data from the input source. In an example where the selected input source is scan service **112**, input selection service **113** receives scanned document data, which identifies the scanned document data as the particular image data.

At step **410**, the particular image data is retrieved from the particular input source. For example, input selection service **113** retrieves the particular image data corresponding to the selected image file from the selected input source based on the

information identifying the selected input source and the information identifying the selected image file.

At step **412**, the particular image data and the post scan processing instructions are sent to a scan server. Within embodiments of the invention, any service running on DSM device **110** may send information for the selected image data and PSP to a scan server for processing, including DSM support service **111**, input selection service **113**, etc. To illustrate one embodiment, input selection service **113** calls an API function for DSM support service **111** and passes to DSM support service **111** the PSP and information for the particular image data (e.g., a reference to the particular image data stored at DSM device **110**, the particular image data itself, etc.). DSM support service **111** transmits the PSP and information for the particular image data to scan server **122** using a distributed scan processing protocol. Scan server **122** processes the received image data according to the accompanying PSP, including dispatching at least a portion of the received image data to the destinations defined in the accompanying PSP.

In an embodiment, if the user selects multiple image files from the selected input source, input selection service **113** sends information for image data corresponding to each of the multiple image files to scan server **122** separately, each with the selected PSP.

Hardware Overview

According to one embodiment, the techniques described herein are implemented by one or more special-purpose computing devices. The special-purpose computing devices may be hard-wired to perform the techniques, or may include digital electronic devices such as one or more application-specific integrated circuits (ASICs) or field programmable gate arrays (FPGAs) that are persistently programmed to perform the techniques, or may include one or more general purpose hardware processors programmed to perform the techniques pursuant to program instructions in firmware, memory, other storage, or a combination. Such special-purpose computing devices may also combine custom hard-wired logic, ASICs, or FPGAs with custom programming to accomplish the techniques. The special-purpose computing devices may be desktop computer systems, portable computer systems, handheld devices, networking devices or any other device that incorporates hard-wired and/or program logic to implement the techniques.

For example, FIG. **5** is a block diagram that illustrates a computer system **500** upon which an embodiment of the invention may be implemented. Computer system **500** includes a bus **502** or other communication mechanism for communicating information, and a hardware processor **504** coupled with bus **502** for processing information. Hardware processor **504** may be, for example, a general purpose microprocessor.

Computer system **500** also includes a main memory **506**, such as a random access memory (RAM) or other dynamic storage device, coupled to bus **502** for storing information and instructions to be executed by processor **504**. Main memory **506** also may be used for storing temporary variables or other intermediate information during execution of instructions to be executed by processor **504**. Such instructions, when stored in non-transitory storage media accessible to processor **504**, render computer system **500** into a special-purpose machine that is customized to perform the operations specified in the instructions.

Computer system **500** further includes a read only memory (ROM) **508** or other static storage device coupled to bus **502** for storing static information and instructions for processor **504**. A storage device **510**, such as a magnetic disk or optical disk, is provided and coupled to bus **502** for storing information and instructions.

Computer system **500** may be coupled via bus **502** to a display **512**, such as a cathode ray tube (CRT), for displaying information to a computer user. An input device **514**, including alphanumeric and other keys, is coupled to bus **502** for communicating information and command selections to processor **504**. Another type of user input device is cursor control **516**, such as a mouse, a trackball, or cursor direction keys for communicating direction information and command selections to processor **504** and for controlling cursor movement on display **512**. This input device typically has two degrees of freedom in two axes, a first axis (e.g., x) and a second axis (e.g., y), that allows the device to specify positions in a plane.

Computer system **500** may implement the techniques described herein using customized hard-wired logic, one or more ASICs or FPGAs, firmware and/or program logic which in combination with the computer system causes or programs computer system **500** to be a special-purpose machine. According to one embodiment, the techniques herein are performed by computer system **500** in response to processor **504** executing one or more sequences of one or more instructions contained in main memory **506**. Such instructions may be read into main memory **506** from another storage medium, such as storage device **510**. Execution of the sequences of instructions contained in main memory **506** causes processor **504** to perform the process steps described herein. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions.

The term "storage media" as used herein refers to any non-transitory media that store data and/or instructions that cause a machine to operation in a specific fashion. Such storage media may comprise non-volatile media and/or volatile media. Non-volatile media includes, for example, optical or magnetic disks, such as storage device **510**. Volatile media includes dynamic memory, such as main memory **506**. Common forms of storage media include, for example, a floppy disk, a flexible disk, hard disk, solid state drive, magnetic tape, or any other magnetic data storage medium, a CD-ROM, any other optical data storage medium, any physical medium with patterns of holes, a RAM, a PROM, and EPROM, a FLASH-EPROM, NVRAM, any other memory chip or cartridge.

Storage media is distinct from but may be used in conjunction with transmission media. Transmission media participates in transferring information between storage media. For example, transmission media includes coaxial cables, copper wire and fiber optics, including the wires that comprise bus **502**. Transmission media can also take the form of acoustic or light waves, such as those generated during radio-wave and infra-red data communications.

Various forms of media may be involved in carrying one or more sequences of one or more instructions to processor **504** for execution. For example, the instructions may initially be carried on a magnetic disk or solid state drive of a remote computer. The remote computer can load the instructions into its dynamic memory and send the instructions over a telephone line using a modem. A modem local to computer system **500** can receive the data on the telephone line and use an infra-red transmitter to convert the data to an infra-red signal. An infra-red detector can receive the data carried in the infra-red signal and appropriate circuitry can place the data on bus **502**. Bus **502** carries the data to main memory **506**, from which processor **504** retrieves and executes the instructions. The instructions received by main memory **506** may

optionally be stored on storage device **510** either before or after execution by processor **504**.

Computer system **500** also includes a communication interface **518** coupled to bus **502**. Communication interface **518** provides a two-way data communication coupling to a network link **520** that is connected to a local network **522**. For example, communication interface **518** may be an integrated services digital network (ISDN) card, cable modem, satellite modem, or a modem to provide a data communication connection to a corresponding type of telephone line. As another example, communication interface **518** may be a local area network (LAN) card to provide a data communication connection to a compatible LAN. Wireless links may also be implemented. In any such implementation, communication interface **518** sends and receives electrical, electromagnetic or optical signals that carry digital data streams representing various types of information.

Network link **520** typically provides data communication through one or more networks to other data devices. For example, network link **520** may provide a connection through local network **522** to a host computer **524** or to data equipment operated by an Internet Service Provider (ISP) **526**. ISP **526** in turn provides data communication services through the world wide packet data communication network now commonly referred to as the "Internet" **528**. Local network **522** and Internet **528** both use electrical, electromagnetic or optical signals that carry digital data streams. The signals through the various networks and the signals on network link **520** and through communication interface **518**, which carry the digital data to and from computer system **500**, are example forms of transmission media.

Computer system **500** can send messages and receive data, including program code, through the network(s), network link **520** and communication interface **518**. In the Internet example, a server **530** might transmit a requested code for an application program through Internet **528**, ISP **526**, local network **522** and communication interface **518**.

The received code may be executed by processor **504** as it is received, and/or stored in storage device **510**, or other non-volatile storage for later execution.

In the foregoing specification, embodiments of the invention have been described with reference to numerous specific details that may vary from implementation to implementation. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense. The sole and exclusive indicator of the scope of the invention, and what is intended by the applicants to be the scope of the invention, is the literal and equivalent scope of the set of claims that issue from this application, in the specific form in which such claims issue, including any subsequent correction.

What is claimed is:

1. A computing device comprising:

one or more processors;

one or more memories;

a scan service, implemented by the one or more processors and being configured to scan a document;

an input selection service, implemented by the one or more processors and being configured to:

identify one or more input sources, available to the computing device, other than the scan service,

cause information identifying the scan service on the computing device and the one or more input sources to be displayed in a graphical user interface,

receive, via the graphical user interface, input source information identifying selection of a particular input source of the input sources displayed in the graphical user interface comprising: the one or more input sources, and the scan service,

receive image information identifying particular image data residing on the particular input source,

retrieve the particular image data from the particular input source, and

make the particular image data available to a distributed scan management support service implemented by the one or more processors on the computing device; and

wherein the distributed scan management support service implements a distributed scan device protocol and a distributed scan processing protocol and is configured to:

receive information for post scan processing instructions, and

send the particular image data with the post scan processing instructions to a scan server.

2. The computing device of claim **1** wherein the particular image data is not generated by the scan service.

3. One or more non-transitory computer-readable media storing instructions which, when processed by one or more processors, cause:

a scan service executing on a scanning device and being configured to scan a document;

an input selection service executing on the scanning device and:

identifying one or more input sources available to the scanning device, other than the scan service,

causing information identifying the scan service on the scanning device and the one or more input sources to be displayed in a graphical user interface,

receiving, via the graphical user interface, input source information identifying selection of a particular input source of the input sources displayed in the graphical user interface comprising: the one or more input sources, and the scan service,

receiving image information identifying particular image data residing on the particular input source,

retrieving the particular image data from the particular input source, and

making the particular image data available to a distributed scan management service executing on the scanning device; and

wherein the distributed scan management service performs the steps of:

implementing a distributed scan device protocol and a distributed scan processing protocol,

receiving information for post scan processing instructions, and

sending the particular image data with the post scan processing instructions to a scan server.

4. The one or more non-transitory computer-readable media of claim **3** wherein the particular image data is not generated by the scan service.

5. A computer-executed method comprising:

a scanning device executing a scan service configured to scan a document;

the scanning device identifying one or more input sources available to the scanning device, other than the scan service;

the scanning device causing information identifying the scan service on the scanning device and the one or more input sources to be displayed in a graphical user interface,

the scanning device receiving, via the graphical user interface, input source information identifying selection of a

particular input source of the input sources displayed in the graphical user interface comprising: the one or more input sources, and the scan service;

the scanning device receiving image information identifying particular image data residing on the particular input source;

the scanning device retrieving the particular image data from the particular input source;

the scanning device receiving information for post scan processing instructions; and

sending the particular image data with the post scan processing instructions to a scan server;

wherein the scanning device implements a distributed scan device protocol and a distributed scan processing protocol.

6. The computer-executed method of claim **5**, wherein:

the particular image data is not generated by the scan service.

7. The computing device of claim **1**, wherein the input selection service is further configured to:

cause directory listing information, identifying data stored at the particular input source, to be displayed in a graphical user interface;

wherein the directory listing information comprises information identifying the particular image data.

8. The computing device of claim **1**, wherein:

the particular image data represents a particular image file; and

the image information identifies selection of the particular image file from among one or more image files represented on the particular input source.

9. The one or more non-transitory computer-readable media of claim **3**, wherein the instructions further comprise instructions which, when executed by the one or more processors, cause:

the input selection service causing directory listing information, identifying data stored at the particular input source, to be displayed in a graphical user interface;

wherein the directory listing information comprises information identifying the particular image data.

10. The one or more non-transitory computer-readable media of claim **3**, wherein:

the particular image data represents a particular image file; and

the image information identifies selection of the particular image file from among one or more image files represented on the particular input source.

11. The computer-executed method of claim **5**, further comprising:

the scanning device causing directory listing information, identifying data stored at the particular input source, to be displayed in a graphical user interface;

wherein the directory listing information comprises information identifying the particular image data.

12. The computer-executed method of claim **5**, wherein:

the particular image data represents a particular image file; and

the image information identifies selection of the particular image file from among one or more image files represented on the particular input source.

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